# Installation, Operation and Maintenance Manual

## US Water Matrixx Water Softener

### Hardness and Scale Prevention System.

**Matrixx MX-100**
**Matrixx MX-150**
**Matrixx MX-200**
**& HTO Systems**

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## System Specifications

*Figure 1. Specifications*

US Water Systems classifies each softener according to the actual resin capacity. However, this is not the regeneration capacity. The regeneration capacity will be lower than the actual resin capacity. This is due to the resin ' s regeneration salt curve. For example:

A 53,000 grain unit would require 30 lbs of salt during regeneration if the capacity was set to the actual resin capacity (53,000 grains). If the unit is set at 37,000 grains it can be regenerated using only 10 lbs of salt. The unit is much more efficient when it is set using the proper salt curve capacity and salt dosage levels. So you can see that to get the final 16,000 grains from a 53,000 grain unit the salt usage will more than double.

Please use the chart below when setting you softener. This will ensure efficiency and longevity of your unit.

- Maximum Water Temperature = 110°F (43°C)
- Maximum Operating Pressure = 100 PSIG (689 kPa)
- Voltage = 110 volts standard
- Pipe Size = 3/4"

- At the stated service flow rates, the pressure drop through these devices will not exceed 15 psig.
- Changing salt settings from factory setting may require changing injector sizes to achieve stated capacities.
- The manufacturer reserves the right to make product improvements which may deviate from the specifications and descriptions stated herein, without obligation to change previously manufactured products or to note the change.

| Model # | System Capacity Grains | | | Flow Rate | | Regeneration Water | | Mineral Tank Size | Resin Cu. Ft. | Brine Tank/ Cabinet Size Inches | Salt Capacity (Lbs) | Ship Weight (Lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | @ 10 lbs/cu ft | @6 lbs/ cu ft (Factory Settings) | @ 3 lbs/ cu ft | Service USGPM | Back-wash USGPM | Clean Water (Factory Setting) | Problem Water | | | | | |
| 085-MX-100 | 25,000 | 20,000 | 13,000 | 10.0 | 2.0 | 38.0 | 48.0 | 9 X 48 | 1.00 | 15 X 15 X 34.7 | 230 | 122 |
| 085-MX-150 | 37,000 | 30,000 | 18,000 | 12.0 | 2.4 | 48.5 | 60.5 | 10 X 54 | 1.50 | 15 X 15 X 34.7 | 230 | 155 |
| 085-MX-200 | 50,000 | 40,000 | 25,000 | 15.0 | 3.5 | 80.5 | 95.5 | 12 X 52 | 2.00 | 20.3 X 37.4 | 385 | 158 |

**For the HTO systems use the following chart.**

| 465/565 | 1.0 CF | 1.5 CF | 2.0 CF |
|---|---|---|---|
| SYSTEM LANGUAGE | ENGLISH | ENGLISH | ENGLISH |
| VALVE OPERATION | SOFTENER | SOFTENER | SOFTENER |
| REGEN. MODE | METER DELAYED | METER DELAYED | METER DELAYED |
| REGENERATION TIME | 2:00AM | 2:00AM | 2:00AM |
| CAPACITY CALC. | MANUAL | MANUAL | MANUAL |
| CAPACITY | 24,000 | 37,000 | 44,000 |
| BACK WASH | 15.0 | 15.0 | 15.0 |
| BRINE / RINSE | 90.0 | 90.0 | 90.0 |
| RINSE | 15.0 | 15.0 | 15.0 |
| REFILL | 4.7 | 7.1 | 9.5 |

# How Your Water Conditioner Works

The principle behind water softening is simple chemistry. A water softener contains resin beads which hold electrically charged ions. When hard water passes through the softener, calcium and magnesium ions are attracted to the charged resin beads. It's the resulting removal of calcium and magnesium ions that produces soft water.

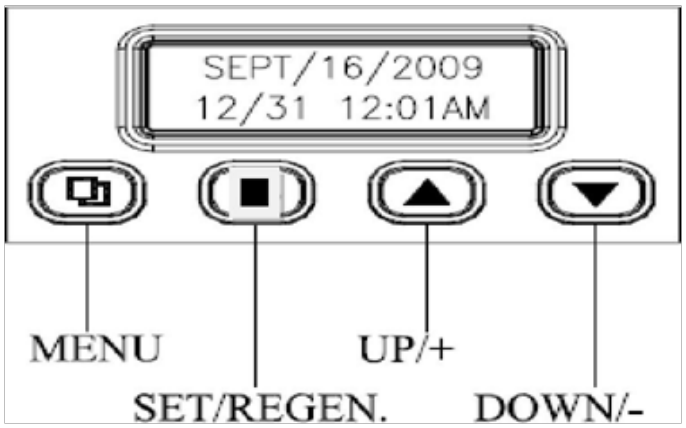
This valve is controlled with simple, user-friendly electronics displayed on a large LCD screen. The main page displays the current date and time. In addition, the main page also shows key valve information and statistics including: current capacity setting, volume remaining, date of last regeneration, current flow rate, and peak flow rate.

*Figure 2. Main Page Displays*

| | | |
|---|---|---|
| **MAY 8, 2012<br>2:30 PM** | **CAPACITY<br>1,545 GAL** | **VOLUME REMAING<br>1,295 GAL** |
| **REGEN DAYS<br>7 DAYS** | **REMAINING DAYS<br>5 DAYS** | **REGENERATION<br>TIME 2:00 AM** |
| **LAST REGEN<br>MAY 2, 2012** | **CURRENT FLOW<br>15 GPM** | **PEAK FLOW<br>5.8 GPM** |

**NOTE:**REGEN DAYS and REMAINING DAYS are only shown in the CALENDAR CLOCK mode or METER OVERRIDE mode.

*Figure 3. Key Pad Configuration*



| | |
|---|---|
| MENU BUTTON | The function of this key is to enter level one programming mode where the valve settings can be adjusted. |
| SET / REGEN BUTTON | This button has two functions. The first is to initiate a manual regeneration by holding the button for 3 or more seconds. The second function is while in programming mode, pressing this key allows the user to change the value of each setting. |
| UP / DOWN ARROWS | These buttons are used to increase or decrease the value of the settings while in the programming mode. |

## System Initialization

When power is first supplied, the valve may take up to two minutes to initialize the valve. During this time the valve will show "INTIALIZING WAIT PLEASE". Do not touch any buttons at this time. When the valve reaches the service position, it will display the current date and time.

*Figure 4. System Initialization Display*

## Main Valve Functions

**VALVE OPERATION MODE:**

- SOFTENER: Standard water softener operation.
- FILTER: Automatic back washing filters such as Multi-Media Depth Filter or Carbon Filter.
- IRON FILTER: This mode is typically used with Manganese Green Sand Filters.

**REGENERATION MODE:** 1. METER DELAYED 2. METER IMMEDIATE 3. CALENDAR CLOCK 4. METER OVERRIDE

**CAPACITY CALCULATION:** 1. AUTOMATIC 2. MANUAL

**ADJUSTABLE CYCLES:** All of the valve cycles are fully adjustable.
1. BACKWASH 2. BRINE / RINSE
3.RINSE 4. REFILL

**NOTE:** Refer to Level II User Programming for description of each mode.

During a regeneration cycle, the valve will display what position it is advancing to. Once in the correct position, the valve will display the current position along with the time remaining for that cycle. On the bottom row, the time remaining is also graphically displayed.

*Figure 4. Regeneration Cycle Valve Display*

**"MENU BUTTON":** The function of this key is to enter the level one programming mode where the valve set tings can be adjusted.

**"SET / REGEN BUTTON":** This button has two functions. The first is to initiate a manual regeneration by holding the button for 3 or more seconds. The second function is while in programming mode, pressing this key allows the user to change the value of each setting.

**"UP / DOWN":** These buttons are used to increase or decrease the value of the settings while in the programming mode.

**Manual Regeneration (Delayed or Immediate)**

If screen is locked, press "MENU" for 3 seconds to unlock. To initiate an immediate regeneration, press the SET / REGEN button for 3 seconds, an option for delayed or immediate regeneration will appear. Press the SET / REGEN button again and delayed will begin flashing, press the down arrow button to have immediate flash, press the SET / REGEN button and then press the menu button and the valve will immediately start into manual regeneration.

To initiate a delayed regeneration, press the SET / REGEN button for 3 seconds, then press the menu button and a regeneration will be queued to the next pre-set regeneration time (2:00 a.m.).

**Control Operation During A Power Failure**

In the event of power failure, the valve will keep track of the time and day for 48 hours. The programmed settings are stored in a non-volatile memory and will not be lost during a power failure.

If power fails while the unit is in regeneration, the valve will move to the service position from the point it is at once power is restored. However, since the unit did not complete its regeneration, it will queue another regeneration at the next scheduled regeneration time.

If the valve misses a scheduled regeneration due to a power failure, it will queue a regeneration at the next regeneration time once power is restored.

# *Matrixx Tank Installation Instructions*

**WATER PRESSURE: A minimum of 20 pounds of water pressure is required for regeneration valve to operate effectively.**

**ELECTRICAL FACILITIES: An uninterrupted alternating current (A/C) supply is required. Note: Other voltages are available. Please make sure your voltage supply is compatible with your unit before installation.**

**EXISTING PLUMBING: Condition of existing plumbing should be free from lime and iron buildup. Piping that is built up heavily with lime and/or iron should be replaced.**

**LOCATION OF MATRIXX TANK AND DRAIN: The Infusion tank should be located close to a drain to prevent air breaks and back flow.**

**CAUTION: Water pressure is not to exceed 80 psi, water temperature is not to exceed 110°F (43°C), and the unit cannot be subjected to freezing conditions.**

# *Media Installation*

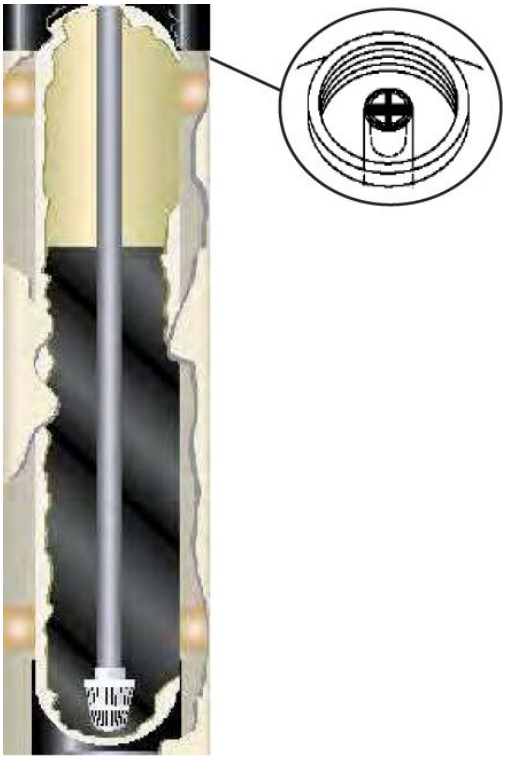
## Assembly Instructions

**Media Installation (for HTO systems please refer to the Quick Start Guide)**

**1) Remove the tank from carton.**

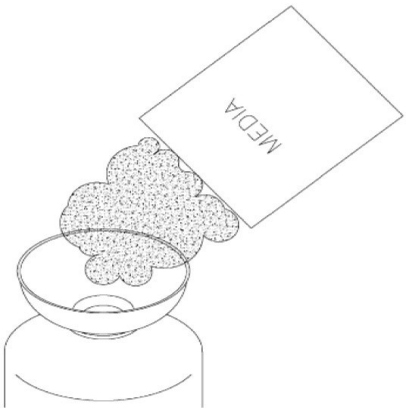
**2) Verify the riser tube is centered in the bottom center of the tank. A flashlight may be necessary.**

**3) Place a piece of duct tape over the riser tube so no media enters the riser while filling.**



**4) Make sure the riser is centered to facilitate the valve installation after installation of the media.**

**5) Use the Blue Funnel provided, to pour the media into the tank. Pour it evenly around the hole to ensure it is well distributed in the tank and pour slow enough, to keep from plugging the hole.**




**6) When media is installed move tank side to side to settle the media.**

## Assembly Instructions

Valve Installation
1) Remove the tape from the riser and discard.
2) Lubricate the two o-rings with a light coat of Silicone.
3) Install the Upper Basket to the valve, twisting it to lock it in place (if not already installed).
4) Slip the Upper Basket over the Riser sliding it down into place and screw the valve on and tighten.
5) Follow the installation procedures in this manual and program accordingly.

## General Installation

| | |
|---|---|
| Water Pressure | Minimum 25 PSI |
| Electrical Supply | Uninterrupted AC |
| Existing Plumbing | Free of any deposits or build-ups inside pipes. |
| Unit Location | Locate close to drain and connect according to plumbing codes |
| Bypass Valves | Always provide for bypass valve if unit is not equipped with one. |
| Plumbing | Softener and or other water treatment equipment should be installed to local plumbing codes |

**CAUTION**
- Do not exceed 120 psi water pressure.
- Do not exceed 110°F water temperature.
- Do not subject unit to freezing conditions.

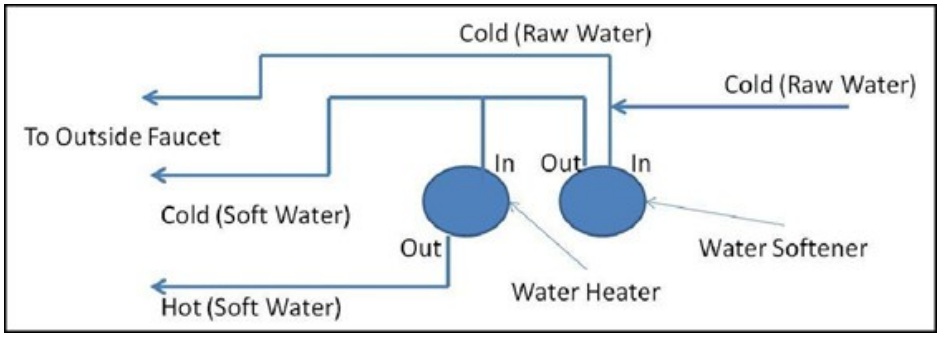
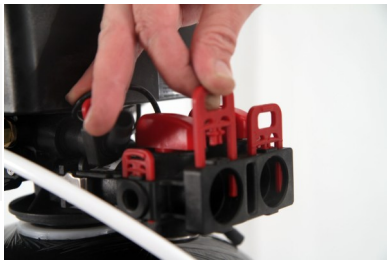



*Figure 5. Piping Diagram*

1. Locate the softener tank and brine tank close to a drain where the system will be installed. The surface should be clean and level.

2. Perform all plumbing according to local plumbing codes.
   Use a 1/2” minimum pipe or tubing size for the drain line
   Use a 3/4” pipe or tubing for backwash flow rates that exceed 7 gpm or length that exceeds 20ft (6 m)
3. Any solder joints near the valve must be done before connecting any piping to the valve. Always leave at least 6" (152 mm) between the valve and joints when soldering pipes that are connected to the valve. Failure to do this could cause damage to the valve.
4. Chose the plumbing connectors and install them in the bypass valve. Remove the red clip and insert the connector. Re-install the red clip to secure the connector.



4. Connect the drain line to the valve.

Hose barb fitting for drain line.

Be sure to use a hose clamp

5. Connect the brine line from the valve to the air check / safety elbow. Double check to make sure all connections are assembled correctly and the plastic nut is tight and secure to prevent leaks. Remove the clip from the brine connection on the valve and push the brine line in the connector. Be sure the line is pushed in completely. Pull on the line to make sure it is secure. Re-install the clip to lock the fitting.

6. Add water until there is approximately 2" (25 mm) of water above the grid plate. If the tank does not have a grid, add water until it is above the air check in the brine tank. Add (2) 50 lb. bags of salt to the brine tank.

7. Place the unit in the bypass position. The unit is in bypass when both red handles are pointing to each other (bisecting the plumbing connections).

8. Slowly turn on the main water supply.
9. At the nearest cold treated water tap nearby remove the faucet screen, open the faucet and let water run a few minutes or until the system is free of any air or foreign material resulting from the plumbing work. Close the water tap when water runs clean, then proceed to start up instructions.

## Start-Up Instructions

1. Plug the valve into an approved power source.
2. When power is supplied to the control, the screen will display "INITIALIZING WAIT PLEASE" while it finds the service position.
3. Press "SET/REGEN" and hold for 3 seconds to initiate a manual regeneration and advance the valve to the Backwash position. Open the inlet on the bypass valve slowly and allow water to enter the unit. Allow all air to escape from the unit before turning the water on fully then allow water to run to drain for 3-4 minutes or until all media fines are washed out of the softener.
4. Press any button to advance to the BRINE position. Check the water level in the brine tank to insure the valve is drawing brine properly.
5. Press any button to advance to the RINSE position. Check the drain line flow. Allow the water to run for 3-4 minutes or until the water is clear.
6. Press any button to advance to the REFILL position. Check that the valve is filling water into the brine tank. Allow the valve to refill for the correct amount of time as displayed on the screen to insure a proper brine solution for the next regeneration.
7. Press any button to advance to the SERVICE position. Open the outlet valve on the bypass, then open the nearest treated water faucet and allow the water to run until clear, close the tap and replace the faucet screen.
8. Add salt into the brine tank.
9. Program hardness and people into controller using Level One Programming Instructions.

# Level I User Programming

**Setting Current Time**

1. If screen is locked, press MENU for 3 seconds to unlock. Press MENU again to enter level one programming mode and adjust CURRENT TIME.
2. Press SET/REGEN to adjust hours. When you have entered the change value mode, the curser will blink. Press UP OR DOWN arrows to change the hour values. Press SET/REGEN again to accept the hour value and advance to change the minutes value. Press UP OR DOWN arrows to change the minute values. Press SET/REGEN again to accept the minute values and advance to adjust the AM/PM values. Press UP OR DOWN to change the AM/PM value. Press SET/REGEN again to accept the AM/PM value and exit. When you have exited the change value mode, the curser will stop flashing.

**Setting Current Date**

Press DOWN to advance to CURRENT DATE.
Using the same procedure as setting the time, press SET/REGEN to enter value change mode.

**Setting Number of People**

Press DOWN to advance to NUMBER PEOPLE.
Press the SET/REGEN to change the value. Press up or down arrows to change the values.

**Setting Water Hardness**

Press DOWN to advance to WATER HARDNESS.
Press the SET/REGEN to change the value. Press UP OR DOWN to change the values.

**NOTE:** When valve is in manual mode disregard setting the NUMBER PEOPLE and WATER HARDESS. (see level II User Programming). The Level I menu will still display NUMBER PEOPLE and WATER HARDNESS but calculations are disabled in manual mode. The capacity and refill time must be manually adjusted.

## Setting Vacation Mode

Press DOWN to advance to VACATION MODE.
Press the SET/REGEN to change the value. Press UP OR DOWN to change the values.

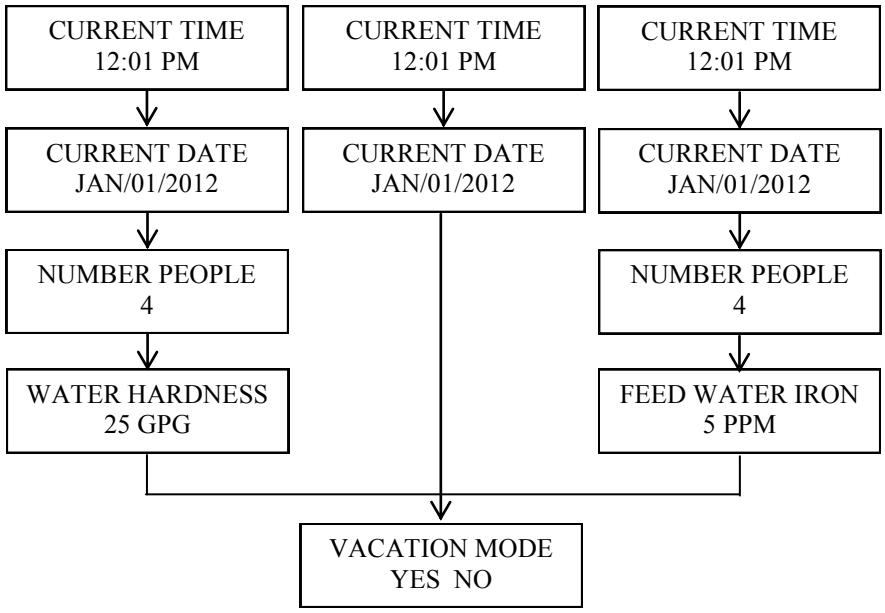
## Exiting Level One User Program Mode

At any time, press the "MENU" to accept all changes and return to main page display.

| Level I User Program Mode | | | |
|---|---|---|---|
| PARAMETER | | OPTIONS | DESCRIPTION |
| 1 | CURRENT TIME | | This option is the current time of day. |
| 2 | CURRENT DATE | | This option is the current date. The date is used to track the last time the system regenerated. |
| 3 | NUMBER PEOPLE | | This value is the number of people living in the home. It is used to calculate the amount of water needed for daily use and the reserve capacity of the system. |
| 4 | WATER HARDNESS | | calculate the system capacity. |
| 5 | VACATION MODE | Yes<br>No | This function may be activated by the user during a prolonged absence such as vacation. The system water fresh in the softener tank and plumbing system. |

*Figure 7. Level I Program Options*

## Level I User Programming Flow Chart



# Level II User Programming

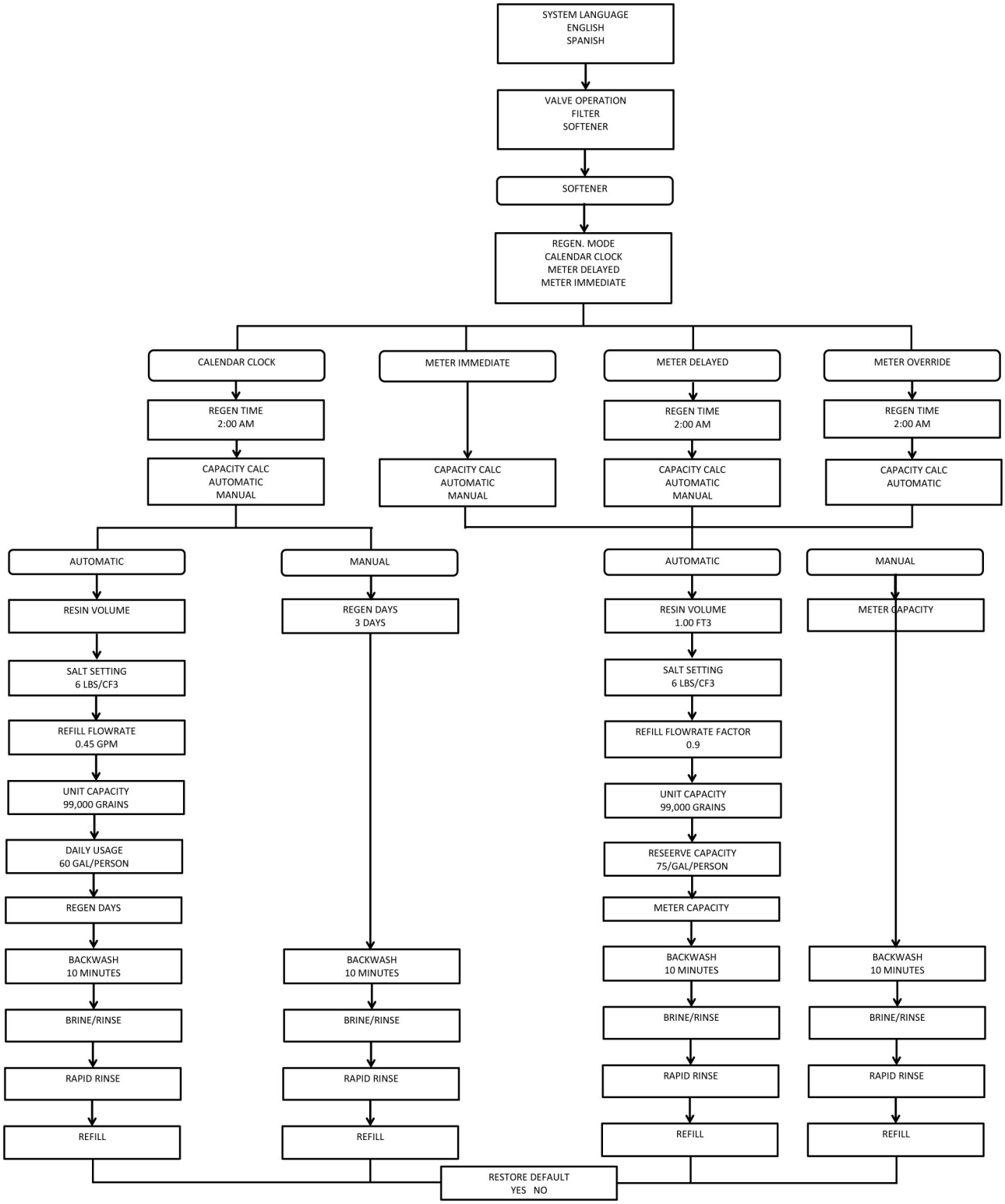
When the Level Two Master Programming Mode is entered, all available option setting displays may be viewed and set as needed. Depending on current option settings, some parameters cannot be viewed or set. If you have a HTO system refer to the Quick Start Guide for programming parameters.

1. If screen is locked, press MENU for 3 seconds to unlock.
2. Press and hold UP & DOWN arrows for three seconds to enter Level Two Master Programming.

## Level II Master Program Mode

| | PARAMETER | OPTIONS | Description |
|---|---|---|---|
| 1 | SYSTEM LANGUAGE | ENGLISH<br>FRENCH<br>SPANISH | This option controls which language should be used in the valve display. |
| 2 | VALVE OPERTAION | SOFTENER<br>FILTER<br>IRON FILTER | There are three basic operating modes to choose depending on the system application. |
| 3 | REGEN. MODE | METER DELAYED | This is the most common setting. When the volume remaining reaches zero gallons, the system will initiate a regeneration at the next pre-set regeneration time. |
| | | METER IMMEDIATE | The unit will initiate a regeneration immediately after the volume remaining reaches zero. |
| | | CALENDER CLOCK | The unit will initiate a regeneration at the next pre-set regeneration time based on the interval of days between regeneration days. |
| | | METER OVERRIDE | When the volume remaining reaches zero gallons, the system will initiate a regenerate at the next pre-set regeneration time. If the days between regeneration is reached before the remaining value reaches zero, the system will override the meter setting and initiate a regeneration. |
| 4 | REGENERATION TIME | | This setting controls the time of day when a regeneration cycle will start. |
| 5 | CAPACITY CALC. | AUTOMATIC | This option automatically calculates the capacity (in gallons for meter units), refill time (in minutes), or regeneration day intervals (days for calendar clock mode). |
| | | MANUAL | The user can manually enter values for capacity, refill time, or regeneration day intervals. |
| 6 | RESIN VOLUME | | This value should be the amount of resin in cubic feet that is loaded in to the tank. The value is used to calculate the system capacity and refill time. |
| 7 | SALT SETTING | | This value is the salt dosage (pounds per cubic foot) to be used when regenerating the system. |
| 8 | REFILL FLOW RATE | | This value is the flow rate (gallons per minute) of the brine line flow control (BLFC) button installed in the valve and is used to calculate the refill time to precisely measure the amount of water into the brine tank. (Note: This value is factory preset and should not be changed unless the BLFC button has been changed to a different size.) |
| 9 | UNIT CAPACITY | | This value (GRAINS for softeners, PPM for IRON FILTERS) is the total capacity of the system. It is used to calculate the capacity of the system in gallons. |
| 10 | CAPACITY | | In MANUAL CAPACITY CALC. mode, the CAPACITY can be adjusted by the user. In AUTOMATIC CAPACITY CALC. mod, the current calculated value is displayed but cannot be adjusted. |
| | | FORMULA | CAPACITY = (UNIT CAPACITY / WATER HARDNESS) / (NUMBER PEOPLE * DAILY USAGE) |
| 11 | DAILY USAGE | | This value is the average amount of water used per person per day. It is used to calculate the REGEN. DAYS for calendar clocks. |
| 12 | RESERVE CAPACITY | | This value is the amount of water per person in gallons to be saved for a reserve capacity. It is used to calculate the CAPACITY of the system. |
| 13 | REGEN. DAYS | | This value is the interval (days) between regenerations in the CALENDAR CLOCK mode. It is also used as the value for the METER OVERRRIDE mode. It can be set by the user in MANUAL CALC. MODE. In AUTOMATIC CAPACITY CALC. mode, the current calculated value is displayed but cannot be adjusted. |
| | | FORMULA | REGEN. DAYS = (UNIT CAPACITY / WATER HARDNESS) / (NUMBER PEOPLE * DAILY USAGE) -1 |
| 14 | BACKWASH | | This option controls the length of time in minutes for the unit to clean the bed by reversing the flow of water upwards through the bed and out to the drain. |
| 15 | BRINE / RINSE | | This option controls the length if time in minutes for the unit to draw regeneratn (brine for softeners) from the second tank and slowly rinse it from the top to bottom of the tank. |
| 16 | RINSE | | This option controls the length of time to give the tank a final rinse from the top to the bottom in order to remove any last traces of the regenerant (brine) from the tank. |
| 17 | REFILL | | solution (brine for softeners) for the next regeneration cycle. The water is accurately measured through the valves brine line flow control to make a precise quantity of regenerant solution. In MANUAL CAPACITY CALC. mode, the REFILL time can be adjusted by the user. In AUTOMATIC capacity calc. mode, the current calculated value is displayed but cannot be adjusted. |
| | | FORMULA | REFILL = SALT SETTING * RESIN VOLUME / 3 / REFILL FLOW RATE |
| 18 | RESTORE DEFAULT | YES<br>NO | This option allows the current settings to be erased and changed back to the default settings. |

## Level II User Programming Softener Flow Chart



**Diagnostics Mode**

1. If screen is locked, press "MENU" for 3 seconds to unlock.
2. Press and hold the UP and DOWN buttons for three seconds to enter Level Diagnostics Mode. In this mode, key diagnostics can be viewed for trouble shooting and problem solving. In addition, the values can be reset to zero individually by pressing "SET/REGEN" for 3 seconds

| PARAMETER | DESCRIPTION |
|---|---|
| LAST REGEN | This value is the date the valve last performed a regeneration cycle. |
| TOTAL REGENS | Total performed. |
| METER TOTAL | This value is the total number of gallons the system has treated. |
| CURRENT FLOW RATE | This is the current flow rate of the unit. |
| CURRENT REFILL | This is the current value of the REFILL calculation. |
| CAPACITY | This is the current value of the CAPACITY calculation. |
| REGEN. DAYS | This is the current value of the REGEN. DAYS calculation. |
| PEAK FLOW RATE | This is the highest flow rate (in GPM) recorded by the valves flow meter in the past 48hours. |
| SOFTWARE VER. | This is the current version of software. |

**Vacation Settings Mode**

1. If screen is locked, press " MENU" for 3 seconds to unlock.
2. Press the DOWN arrow for 3 seconds to enter the Vacation Settings Mode. In this mode the length of time for backwash and rinse along with the frequency are set while the valve is in vacation mode.

| PARAMETER | DESCRIPTION |
|---|---|
| REGEN. DAYS | This value is the frequency of how often the unit should perform a brief backwash and rinse. |
| BACKWASH | This option controls the length of time in minutes for the unit to briefly clean the bed by reversing the flow of water upwards through the bed and out to the drain. |
| RINSE | This option controls the length of time to give the tank a brief rinse from the top to the bottom in order to remove any stale or stagnant water from the tank. |

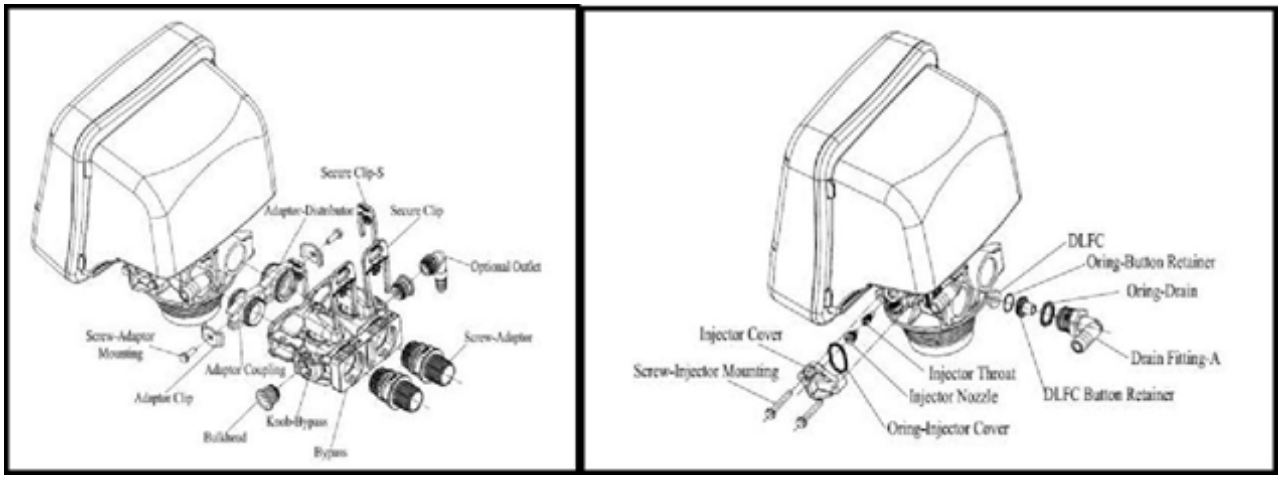
## Valve Cycle Settings for Softeners

| MODEL | VALVE CYCLE SETTINGS (MINUTES) | | | | | | INJECTOR SIZE | DRAIN LINE FLOW CONTROL (GPM) | BRINE LINE FLOW CONTROL (GPM) |
|---|---|---|---|---|---|---|---|---|---|
| | CLEAN WATER | | | PROBLEM WATER | | | | | |
| | BACKWASH | BRINE/RINSE | RINSE | BACKWASH | BRINE/RINSE | RINSE | | | |
| IWT565-75 | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #00 | #1 (1.5) | 0.70 |
| IWT565-100 | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #0 | #2 (2.0) | 0.70 |
| IWT565-150 | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #1 | #3 (2.4) | 0.70 |
| IWT565-200 | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #2 | #4 (3.5) | 0.70 |
| IWT565-250 | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #2 | #6 (4.0) | 0.70 |
| IWT565-300 | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #3 | #7 (5.0) | 0.70 |
| IWT565-75C | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #00 | #2 (2.0) | 0.70 |
| IWT565-100C | 5.0 | 50.0 | 5.0 | 10.0 | 50.0 | 5.0 | #0 | #3 (2.4) | 0.70 |

*Figure 13. Valve Cycle Settings*

## Changing Valve Cycle Settings

1. Press the “MENU” for three seconds to unlock screen.
2. Press and hold “UP and DOWN” for three seconds to enter Level Two Master Programming.
3. Press the “DOWN” and advance to the BACKWASH menu option. Press “SET/REGEN” to edit the BACKWASH minutes. Press “UP or DOWN” arrows to change the BACKWASH minute values. Press “SET/REGEN” again to accept the new value.
4. Press the “DOWN” twice to advance to the RINSE menu option. Press ”SET/REGEN” to edit the RINSE minutes. Press ”UP or DOWN” arrow to change the RINSE minute values. Press ”SET/REGEN” again to accept the new value.
5. Press “MENU” to exit programming mode.



**Automatic Bypass**

The regeneration cycle lasts approximately 75 minutes, after which soft water service will be restored. During regeneration, hard water is automatically bypassed for use in the household. Hot water should be used as little as possible during this time to prevent hard water from filling the water heater. This is why automatic regeneration is set for sometime during the night and manual regenerations should be performed when little or no water will be used in the household.

**Safety Float**

The brine tank is equipped with a safety float which prevents your brine tank from overfilling as a result of a malfunction such as a power failure.

**New Sounds**

You may notice new sounds as your water softener operates. The regeneration cycle lasts approximately 2-1/2 hours. During this time, you may hear water running intermittently to the drain.

**Manual Bypass**

In the case of emergency, such as an overflowing brine tank, you can isolate your water softener from the water supply using the bypass valve located at the back of the control. In normal operation the bypass is open with the on/off knobs in line with the inlet and outlet pipes. To isolate the softener, simply rotate the knobs counter clockwise until they lock. You can use your water related fixtures and appliances as the water supply is bypassing the softener. However, the water you use will be hard. To resume soft water service, open bypass valve by rotating the knobs clockwise.

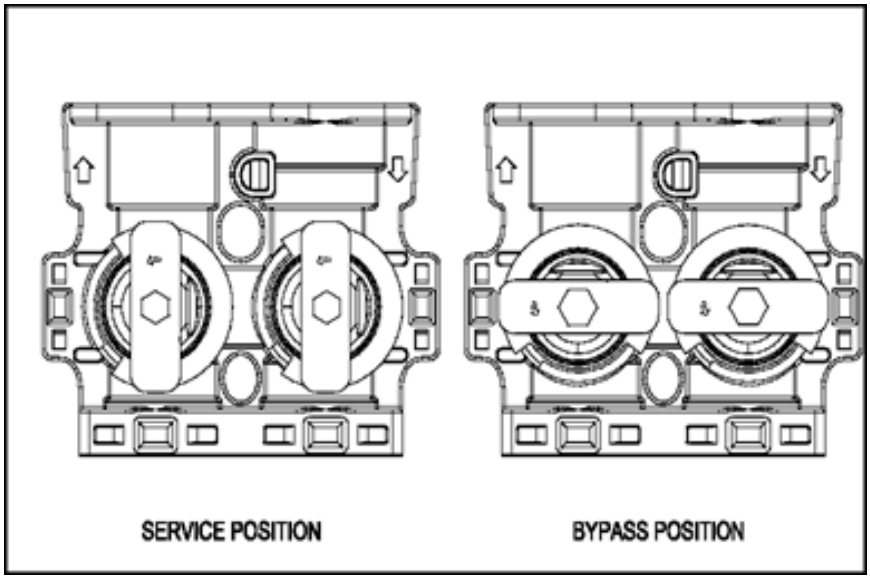



*Figure 15. Bypass Installation View*

# Maintenance

**Adding Salt**

Use only crystal water softener salt. Check the salt level monthly. It is important to maintain the salt level above the water level. To add salt, simply lift the salt lid and add the salt directly into the brine tank. Be sure the brine well cover is on and fill only to the height of the brine well.

**Bridging**

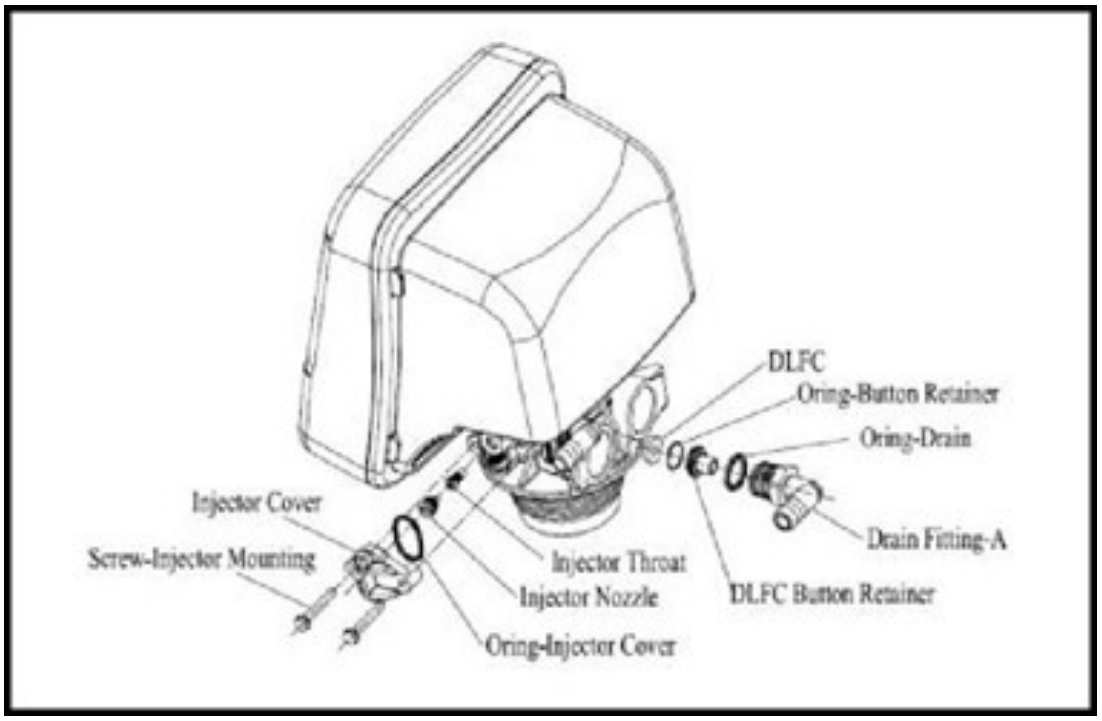
Humidity or wrong type of salt may create a cavity between the water and the salt. This action, known as "bridging", prevents the brine solution from being made, leading to your water supply being hard. If you suspect salt bridging, carefully pound on the outside of the brine tank or pour some warm water over the salt to break up the bridge. This should always be followed up by allowing the unit to use up any remaining salt and then thoroughly cleaning out the brine tank. Allow four hours to produce a brine solution, then manually regenerate the softener.

**Care of Your Softener**

To retain the attractive appearance of your new water softener, clean occasionally with mild soap solution. Do not use abrasive cleaners, ammonia or solvents. Never subject your softener to freezing or to temperatures above 120°F.

**Cleaning the Injector Assembly**

Sediment, salt and silt will restrict or clog the injector. A clean water supply and pure salt will prevent this from happening. The injector assembly is located on the right side of the control valve. This assembly is easy to clean.

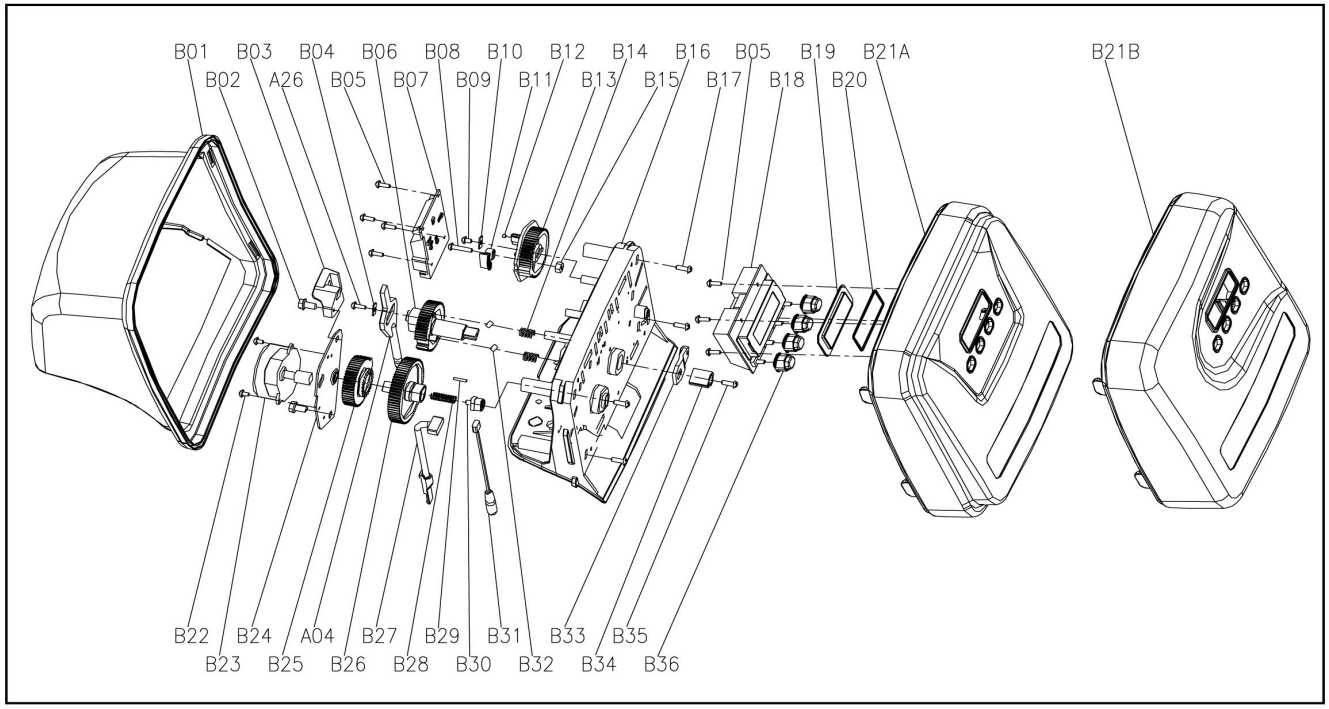


Shut off the water supply to your softener and reduce the pressure by opening a cold soft water faucet. Using a screwdriver, remove the two screws holding the injector cover to the control valve body. Carefully remove the assembly and disassemble as shown in Figure 6. The injector orifice is removed from the valve body by carefully turning it out with a large screwdriver. Remove the injector throat the same way. Carefully flush all parts including the screen. Use a mild acid such as vinegar or Pro-Rust Out to clean the small holes in the orifice and throat.

Reassemble using the reverse procedure.

**Resin Cleaner** An approved resin cleaner must be used on a regular basis if your water supply contains iron. The amount of resin cleaner and frequency of use is determined by the quantity of iron in your water (consult your local representative or follow the directions on the resin cleaner package).

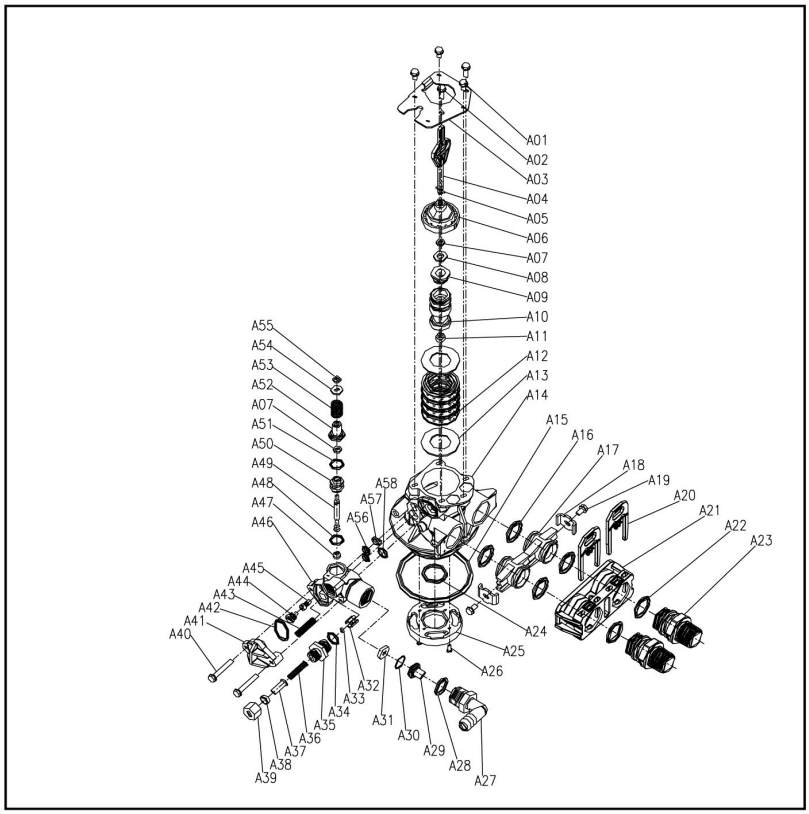
## Valve Drive Assembly Exploded View




| Item No. | Part No. | Part Discription | Quantity |
|---|---|---|---|
| B01 | 05056523 | BNT365 Cover | 1 |
| B02 | 05056136 | Screw-ST3.5×13 (Hexagon with Washer) | 2 |
| B03 | 05010045 | Piston Stem Holder | 1 |
| A26 | 13000426 | Screw-ST2.9×13 (Large Wafer) | 1 |
| B04 | 05056139 | Washer-3x13 | 1 |
| B05 | 05010037 | Screw-ST2.9×10 | 8 |
| B06 | 05056005 | Main Gear | 1 |
| B07 | 05030010 | Bnt85 Main Pcb | 1 |
| B08 | 05056083 | Screw-M4x14 | 1 |
| B09 | 05056166 | Screw-ST4.2×12 (Large Wafer) | 1 |
| B10 | 05056141 | Washer-4x12 | 1 |
| B11 | 05056016 | Brine Regulator | 1 |
| B12 | 05010023 | Magnet-d8×2.7 | 1 |
| B13 | 05056015 | Brine Gear | 1 |
| B14 | 05056095 | Spring Detent | 2 |
| B15 | 05056089 | Nut-M4 | 1 |
| B16 | 05056522 | Bnt365 Housing | 1 |
| B17 | 05056084 | Screw-ST3.5x13 | 4 |
| B18 | 05030020 | Bnt85-Display (NOVO) | 1 |
| | 05056536 | Bnt465 Wiring Harness | 1 |
| B19 | 05056528 | Pcb Cover | 1 |
| B20 | 26010047 | O-Ring-d40×1.8 | 1 |

| Item No. | Part No. | Part Discription | Quantity |
|---|---|---|---|
| B21A | 05056527 | Bnt465 Front Cover | 1 |
| B21B | 05056531 | Bnt565 Front Cover | 1 |
| B22 | 05056082 | Screw-M3×6 | 2 |
| B23 | 05056510 | Motor-12v/2rpm | 1 |
| | 05030014 | Motor Power Cable | 1 |
| | 11700005 | Wire Connector | 2 |
| B24 | 05056045 | Motor Mounting Plate | 1 |
| B25 | 05056501 | Drive Gear | 1 |
| A04 | 05010081 | Bnt65 Piston Rod | 1 |
| B26 | 05056002 | Idler Gear | 1 |
| B27 | 05010031 | Meter Assembly | 1 |
| | 05010046 | Meter Strain Relief | 1 |
| B28 | 05056094 | Spring Idler | 1 |
| B29 | 05056098 | Motor Pin | 1 |
| B30 | 05056502 | Spring Retainer | 1 |
| B31 | 05010029 | Power Cable | 1 |
| | 05056013 | Power Strain Relief | 1 |
| B32 | 05056092 | Ball-1/4inch | 2 |
| B33 | 05056503 | Magnet Holder | 1 |
| B34 | 05056554 | Locking Knob | 1 |
| B35 | 05056561 | Screw-ST3.5×15 (CSK) | 1 |
| B36 | 05056529 | Bnt465 Button | 4 |

## Control Valve Assembly Exploded View




| Item No. | Part No. | Part Discription | Quantity |
|---|---|---|---|
| A01 | 05056087 | Screw-M5×12(Hexagon) | 3 |
| A02 | 05056088 | Screw-M5×16(Hexagon with Washer) | 2 |
| A03 | 05056047 | End Plug Retainer | 1 |
| A04 | 05010081 | Bnt65 Piston Rod | 1 |
| A05 | 05056097 | Piston Pin | 1 |
| A06 | 05056023 | End Plug | 1 |
| A07 | 05056070 | Quad Ring | 2 |
| A08 | 05056024 | End Plug Washer | 1 |
| A09 | 05056022 | Piston Retainer | 1 |
| A10 | 05056181 | Piston (Electrical) | 1 |
| A11 | 05056104 | Muffler | 1 |
| A12 | 05056021 | Spacer | 4 |
| A13 | 05056073 | Seal | 5 |
| A14 | 05056019 | Bnt65 Valve Body | 1 |
| A15 | 05056063 | O-ring-d78.74×5.33 | 1 |
| A16 | 05056129 | O-ring-d23×3 | 4 |
| A17 | 05056025 | Adaptor Coupling | 2 |
| A18 | 05056044 | Adaptor Clip | 2 |
| A19 | 05056090 | Screw-ST4.2×13(Hexagon with Washer) | 2 |
| A20 | 21709003 | Secure Clip | 2 |
| A21 | 05056140 | Valve Connector | 1 |
| A22 | 05056065 | O-ring-d23.6×2.65 | 2 |
| A23 | 21319006 | Screw Adaptor | 2 |
| A24 | 26010103 | O-ring-d25×3.55 | 1 |
| A25 | 07060007 | Valve Bottom Connector | 1 |
| A26 | 13000426 | Screw-ST2.9×13(Large Wafer) | 2 |
| A27 | 05056038 | Drain Fitting | 1 |
| A28 | 26010003 | O-Ring-d18×2.65 | 1 |
| A29 | 05056036 | DLFC Button Retainer | 1 |

| Item No. | Part No. | Part Discription | Quantity |
|---|---|---|---|
| A30 | 05056079 | O-Ring-d15×0.8 | 1 |
| A31 | 05056143 | DLFC-2# | 1 |
| A32 | 05056035 | BLFC Button Retainer | 1 |
| A33 | 05056191 | BLFC-2# | 1 |
| A34 | 05056138 | O-Ring-d14×1.8 | 1 |
| A35 | 05056100B | BLFC Fitting | 1 |
| A36 | 05056106 | Brine Line Screen | 1 |
| A37 | 05056107 | BLFC Tube Insert | 1 |
| A38 | 05056033 | BLFC Ferrule | 1 |
| A39 | 05056108 | BLFC Fitting Nut | 1 |
| A40 | 05056086 | Screw-M5×30(Hexagon with Washer) | 2 |
| A41 | 05056029 | Injector Cover | 1 |
| A42 | 05056072 | O-Ring-d24×2 | 1 |
| A43 | 05056103 | Injector Screen | 1 |
| A44 | 05056027 | Injector Nozzle | 1 |
| A45 | 05056028 | Injtor Throat | 1 |
| A46 | 05056177 | Injector Body | 1 |
| A47 | 05056075 | Injector Seat | 1 |
| A48 | 05056134 | O-Ring-d12×2 | 1 |
| A49 | 05056054 | Injector Stem | 1 |
| A50 | 05056031 | Injector Spacer | 1 |
| A51 | 05056081 | O-Ring-d12.5×1.8 | 1 |
| A52 | 05056030 | Injector Cap | 1 |
| A53 | 05056093 | Injector Screen | 1 |
| A54 | 05010049 | Special Washer | 1 |
| A55 | 05056105 | Retaining Ring | 1 |
| A56 | 05056067 | O-Ring-d7.8×1.9) | 2 |
| A57 | 05056037 | Air Disperser | 1 |
| A58 | 05056066 | O-Ring-d11×2 | 1 |

## Trouble Shooting

| Issue | Possible Cause | Possible Solution |
|---|---|---|
| A. Unit fails to initiate a regeneration cycle. | 1. No power supply. | Check electrical service, fuse, etc. |
| | 2. Defective circuit board. | Replace faulty parts. |
| | 3. Power failure. | Reset time of day. |
| B. Water is hard. | 1. By-pass valve open. | Close by-pass valve. |
| | 2. Out of salt. | Add salt to tank. |
| | 3. Plugged injector / screen. | Clean parts. |
| | 4. Flow of water blocked to brine tank. | Check brine tank refill rate. |
| | 5. Hard water in hot water tank. | Repeat flushing of hot water tank required. |
| | 6. Leak between valve and central tube. | Check if central tube is cracked or o-ring is damaged. Replace faulty parts. |
| | 7. Internal valve leak. | Replace valve seals, spacer, and piston assembly. |
| C. Salt use is high. | 1. Refill time is too high. | Check refill time setting. |
| D. Low water pressure. | 1. Iron or scale build up in line feeding unit. | Clean pipes. |
| | 2. Iron build up inside valve or tank. | Clean control and add resin cleaner to clean bed. Increase regeneration frequency. |
| | 3. Inlet of control plugged due to foreign material. | Remove piston and clean control valve. |
| E. Resin in drain line. | 1. Air in water system. | Check well system for proper air eliminator control. |
| | 2. Incorrect drain line flow control (DLFC) button. | Check for proper flow rate. |
| F. Too much water in brine tank. | 1. Plugged injector or screen. | Clean parts. |
| | 2. Valve not regenerating. | Replace circuit board, motor, or control. |
| | 3. Foreign material in brine valve. | Clean parts. |
| G. Unit fails to draw brine. | 1. Drain line flow control is plugged. | Clean parts. |
| | 2. Injector or screen is plugged. | Clean parts. |
| | 3. Inlet pressure too low. | Increase pressure to 25 PSI. |
| | 4. Internal valve leak. | Replace seals, spacers, and piston assembly. |
| H. Valve continuously cycles. | 1. Defective position sensor PCB. | Replace faulty parts. |
| I. Flow to drain continuously. | 1. Valve settings incorrect. | Check valve settings. |
| | 2. Foreign material in control valve. | Clean control. |
| | 3. Internal leak. | Replace seals, spacers, and piston assembly. |

# Limited Lifetime Warranty

For the lifetime of the original purchaser, at the original residential place of installation of this *Matrixx* Water Conditioning System, *US WATER SYSTEMS, INC.* warrants the following:

## LIFETIME COVERAGE

**Media Tank**

Free of all costs to you except transportation and labor charges, we warrant that we will replace or repair the fiberglass media tank, if for any reason it is found to be defective, because of faulty materials or workmanship.

**Brine Tank**

Free of all costs to you except transportation and labor charges, we warrant that we will replace or repair the plastic brine tank, if for any reason it is found to be defective, because of faulty materials or workmanship.

## SEVEN YEAR COVERAGE

**Valve & Electronics**

We warrant that for seven (7) years from the date of purchase, we will replace or repair the valve and electronics , if for any reason it is found to be defective, because of faulty materials or workmanship at no charge to you except for transportation and standard labor charges.

**Resin**

We warrant that for seven (7) years from the date of purchase, we will replace the softening resin that has failed at no charge to you except for transportation and standard labor charges. Resin damage caused by water conditions prohibited in this manual will not be covered (see General Provisions).

## GENERAL PROVISIONS

This warranty does not apply to any commercial or industrial installations or to any part of the water conditioner which has been subjected to misuse, neglect, alteration or accident; or to any damage caused by fire, flood, freezing, Acts of God, or any other casualty, or if the original serial numbers have been removed. Fouling or damage to the media caused by iron, sulfur, bacterial iron, silt, sand, tannins, organics, hot water or chlorine voids the warranty on media.

These warranties are in lieu of all other warranties expressed. or implied, and we do not authorize any person to assume for us any other obligation on the sale of this water conditioner. No responsibility is assumed for delays or failure to meet these warranties caused by strike, government regulations or other circumstances beyond the control of *US WATER SYSTEMS, INC.*.

TO OBTAIN WARRANTY SERVICE, CALL OR WRITE: *US WATER SYSTEMS, INC. 1209 COUNTRY CLUB ROAD INDIANAPOLIS, IN 46234 (800) 608-USWA(8792).*

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SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

THIS WARRANTY MAY BE TRANSFRRED TO A SUBSEQUENT OWNER WITH WRITTEN APPROVAL OF *US WATER* AND PAYMENT OF STANDARD TRANSFER FEE.